PRELIMINARY AND SHORT REPORTS

STUDIES ON THE L. E. PHENOMENON—EVOLUTION OF THE INDUCED L. E. INCLUSION BODY*

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In the course of our studies (1) (2) on the induction of the L. E. phenomenon in normal leukocytes we have found (3) what appeared to us to be an inclusion body not previously reported. In our third communication (3) on this subject we stated that these objects may prove to be stages in the evolution of the typical L. E. body as described by Hargraves,

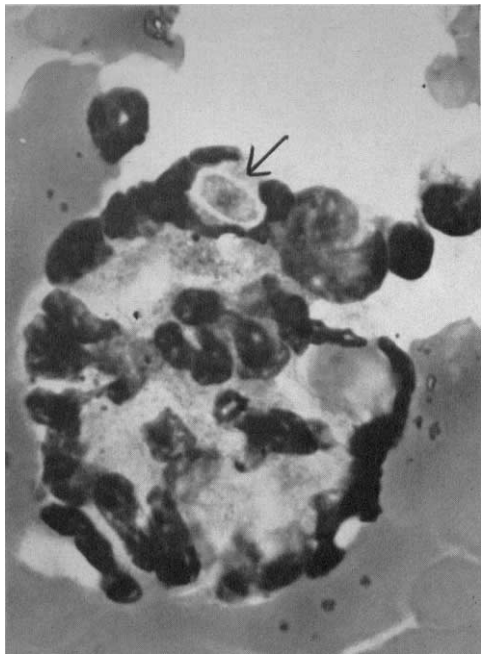

FIG. 1. L. E. cell inclusion, earliest stage (×1530)

Richmond and Morton (4) and by Haserick and Bortz (5). We now have found further evidence which seems to substantiate this hypothesis.

In our last communication (3) we described these inclusions as clumped granules with a central dark dot and surrounded by a clear zone. At first glance, these seem to be far removed from the large cell inclusions described as "found distending the cell membrane and pushing the nuclear lobes to the periphery of the cell". However, both the small, granular, dark staining inclusions and the large cell distending inclusions, are consistently present in leukocytes in heparinized sternal marrow from acute L. E. patients. Identical cell inclusions are present in buffy coat smears of normal blood admixed with acute L. E. serum.

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The small, dark inclusions and the large, light inclusions have not been found in smears of marrow or blood from patients ill of a variety of diseases examined in a lengthy control series.

Acute L. E. smears (Barnes-Moffatt technic) that contain small and large inclusions also contain large numbers of what may be termed intermediate cell inclusions. Intermediate cell inclusions have characteristics or features that place them between the small and the large inclusions. If selected cell inclusions are placed side by side in order of increasing size a transition from the small to the large form may be depicted. Or, if we picture one of the small inclusions undergoing a process of expansion resulting in compression of the clear zone, dispersion of the granules, and fading of the color we have its transformation into the large inclusion.

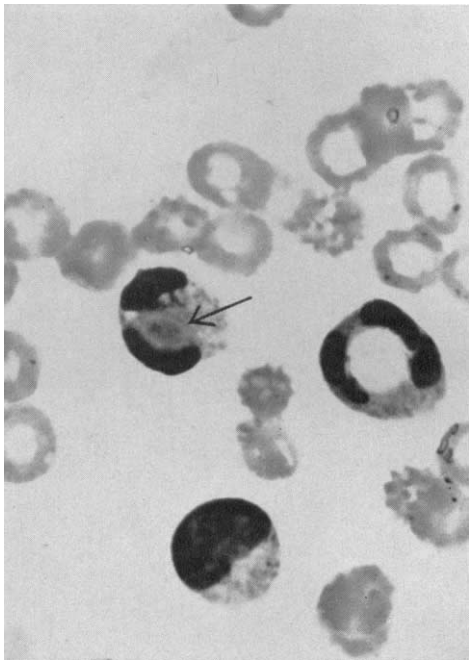

FIG. 2. Earliest cell inclusion in the "Hof" of a nucleus (×1530)

What appears to be the first stage of the formation of the L. E. body is a granular mass with a darker central dot and a surrounding clear zone (Fig. 1). At first glance it gives the impression of being a protozoan parasite. In this same figure is a large, light cell inclusion. Another one of these inclusion bodies is shown (Fig. 2) in the "Hof" of a cell nucleus.

An apparent developmental sequence can be demonstrated (Fig. 3). At the point marked 1 is the body with the surrounding clear zone. This body and the ones marked 2 and 3 appear to be more compactly granular and darker stained than the bodies marked 4 and 5. The body marked 5 occupies by far the greater portion of the cell and is approximately 4 to 6 times as large as the other leukocytes in the same smear. This giant inclusion shows dispersal of granules and stains lightly.

The final cell of the sequence is shown in Fig. 4 and Fig. 5. The cell marked in Fig. 4 is greatly enlarged in Fig. 5. It shows a gap or break in the cell membrane. Nuclear lobes are distinguishable, although stringy and distorted, as if they had been compressed against the cell membrane. The inner part of this giant leukocyte is very pale and gives the impression that a portion of the cell contents had spilled out.

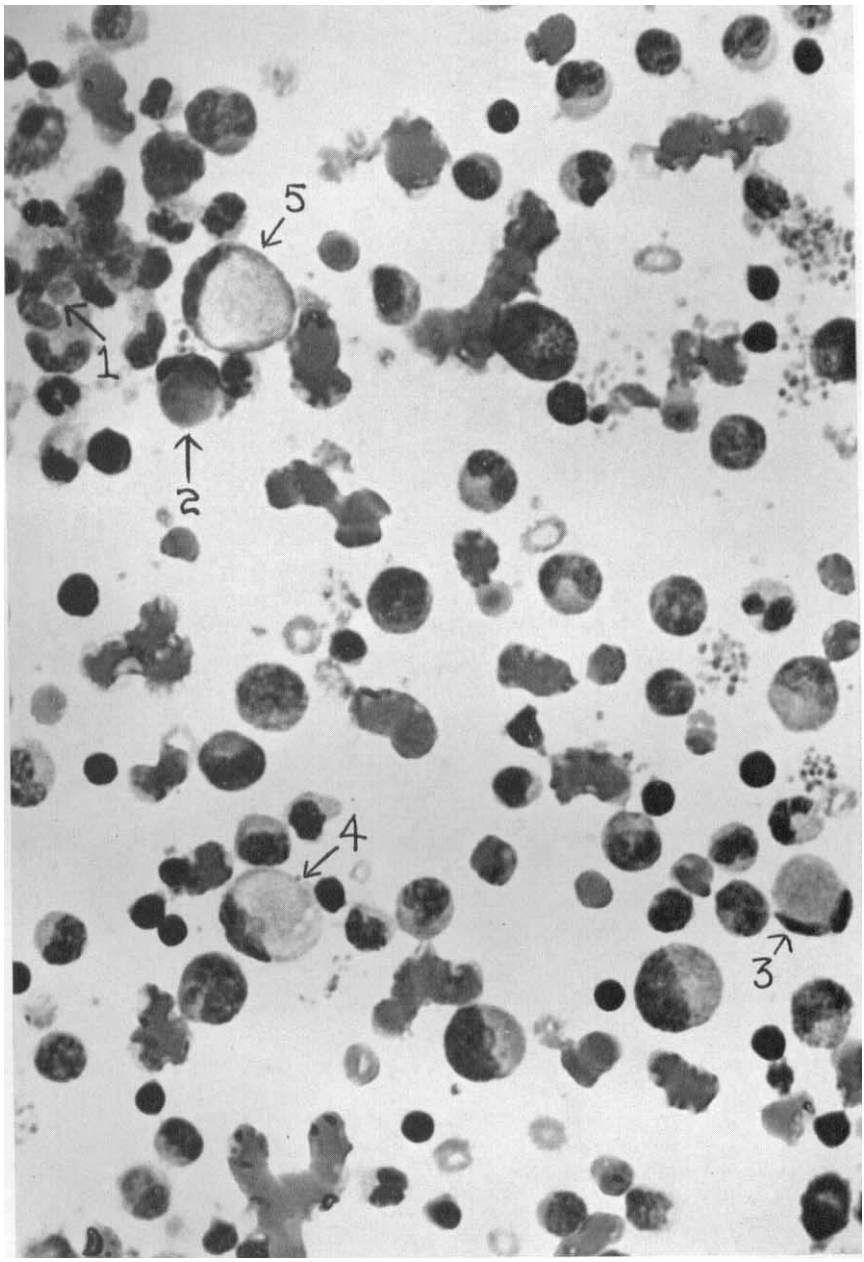

FIG. 3. Apparent sequence of the development of the L. E. Body (×800)

SUMMARY

A sequence showing the apparent development of the L. E. body has been described. Evidence is presented that the L. E. cell may contain small, intermediate or large inclusions with distinctive and diagnostic features.

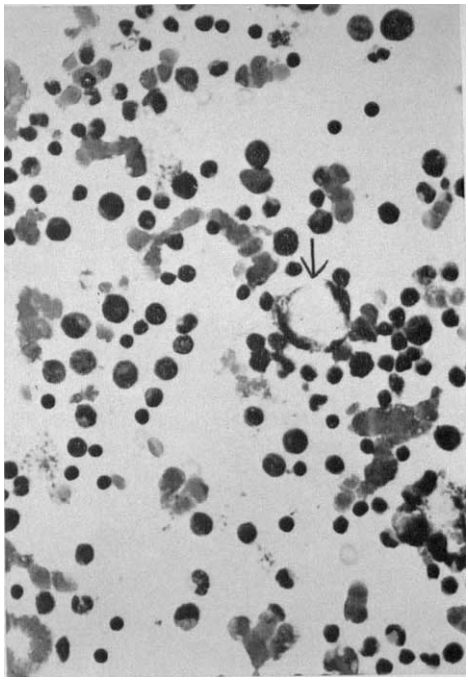

FIG. 4. Final stage; the matured L. E. body in cell with a ruptured wall (×400)

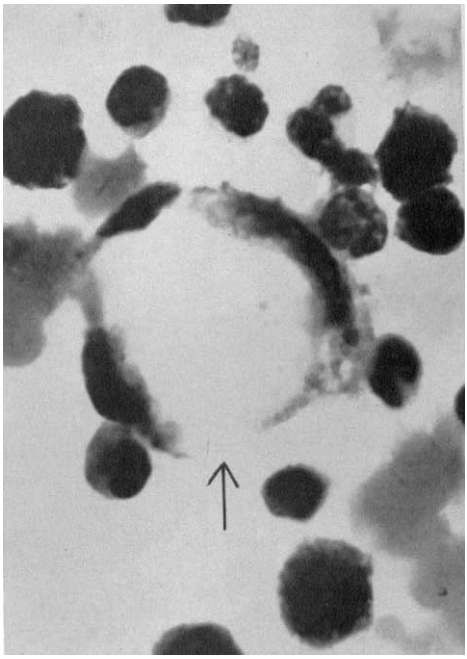

FIG. 5. Enlargement of cell shown in Fig. 4 (×1620)

CONCLUSION

Further studies, both morphological, tinctorial and microchemical must be done in order to confirm these observations.

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